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Rejections

A. 35 U.S.C. § 102

The Examiner rejected claims 1-4, and 6-12 under 35 U.S.C. § 102(b) as being anticipated by Park, U.S. Patent 5,524,092. The rejection is respectfully traversed.

Claim 1

The Examiner alleges that regarding claim 1, Park discloses a metal capped mirror, Fig. 2, comprising a layer 12 consisting of tin oxide to which the metal capping layer 11 is directly adhered. The Applicant respectfully disagrees.

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim" (Lindemann Maschinenfabrik GmbH v. American Hoist & Derrik Co., 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1983)) (emphasis added).

The Park reference fails to teach or disclose at least the invention as recited in the Applicant's claim 1 as follows:

> "In a metal capped mirror comprising a stack of dielectric layers of alternating high and low indices of refraction capped with a layer of metal, the improvement comprising a layer of consisting of tin oxide to which the metal capping layer is directly adhered." (emphasis added).

The Park reference fails to disclose or anticipate a layer consisting of tin oxide as claimed in at least the Applicant's claim 1. The use of an indium tin oxide layer in Park does not anticipate or disclose the use of the claimed tin oxide of the Applicant's invention. Tin oxide is not a conductive material, and in the Applicant's claimed mirrors, does not function as a conductor. In Park, conversely, the layer 12 as alleged by the Examiner to be tin oxide (which it is not) is an electrical conductor and is used in Park for such purpose. (See Park, col. 4, lines 23-31 and lines 63-67). Persons of skill in the relevant art would not

consider replacing the conductor, such as indium tin oxide, of Park with the electrically non-conductive tine oxide layer according to the Applicant's claims.

Furthermore, the Applicant teaches the advantages of using a tin oxide layer over layers of other materials, such as those disclosed in Park:

"In one test, layers of tin oxide (SnO) were deposited on a GaAs substrate at approximately 2 A°/sec using electron beam heating of a source material of stoichiometric tin oxide (SnO_2). Then, various metal capping metals, e.g., gold and copper, were deposited by resistive heating of source materials on respective tin oxide layers. For comparison, the metal capping layers were also deposited on typical dielectric layers used in mirror stacks, e.g., silicon monoxide, silicon dioxide, and titanium dioxide. A standard test for adhesion was performed on the various samples; namely, they were subjected to two minutes in an ultrasonic bath and the degree of delamination of the capping layers was noted. Significantly, less delamination occurred with the metal layers adhered to the tin oxide layers.

While all possible layers useful as capping layers were not tested, based upon experience, the technical literature and the limited tests actually made, it is expected that, in general, and particularly with chemically "pure" (stoichiometric) tin oxide (SnO^2) layers prepared using standard commercially available apparatus, improved adhesion over what was heretofore available is obtained using, in accordance with the invention, a tin oxide layer for adhering a metal capping layer to the end of a mirror stack of dielectric layers." (See Applicant's Specification, page 5, line 17 through page 6, line 12).

It is evident from the discussion above that Park does not teach or disclose a tin oxide layer as claimed and used by the Applicant. As such, the Applicant submits that claim 1 is novel.

Furthermore, the Applicant's claim 1 is directed to an improvement of a metal capped mirror as recited in the preamble of claim 1. The Park reference does not teach an improvement to a metal capped mirror as recited in the Applicant's claim 1. The Applicant specifically points out that "The use of layers of tin oxide in devices other than mirror stacks is known" for applications other than in the claimed invention (See Specification, page 5, lines 13-14), but the claimed improvement of a metal capped mirror as claimed by the Applicant, "the improvement comprising a layer of consisting of tin oxide to which the metal capping layer is directly adhered", is not known and is not taught by Park.

The teachings of Park are directed toward a multilayered ferroelectric-semiconductor memory-device. There is absolutely no teaching or disclosure in Park for an improvement of a metal capped mirror as taught in the Applicant's specification and claimed in at least the Applicant's claim 1.

Therefore, the Applicant submits that claim 1 is not anticipated by the teachings of Park and, as such, fully satisfies the requirements of 35 U.S.C. § 102 and is patentable thereunder.

Likewise, independent claims 6 and 8 recite similar relevant features as recited in claim 1. As such, the Applicant submits that independent claims 6 and 8 are also not anticipated by the teachings of Park and also fully satisfies the requirements of 35 U.S.C. § 102 and is patentable thereunder.

Furthermore, dependent claims 2-4, 7 and 9 -12 depend either directly or indirectly from independent claims 1 and 8 and recite additional features therefor. As such and for at least the reasons set forth herein, the Applicant submits that dependent claims 2-4, 7 and 9 -12 are also not anticipated by the teachings of Park. Therefore the Applicant submits that dependent claims 2-4, 7 and 9 -12 also fully satisfy the requirements of 35 U.S.C. § 102 and are patentable thereunder.

Applicant's Note

With respect to the Uekusa et al. reference cited by the Examiner, Uekusa et al. fails to teach the limitation of "comprising a layer of consisting of tin oxide to which the metal capping layer is directly adhered" as claimed in the Applicant's claim 1.

With respect to the Matsui et al. reference cited by the Examiner, Matsui et al. also fails to teach the limitation of "comprising a layer of consisting of tin oxide to which the metal capping layer is directly adhered" as claimed in the Applicant's claim 1.

The Applicant reserves the right to argue the patentability of the independent claims 6 and 8, and all of the dependent claims separately at a later time in prosecution.

The Applicant would like to thank the Examiner for his assistance in the prosecution of this application.

Conclusion

Thus the Applicant submits that none of the claims, presently in the application, are anticipated under the provisions of 35 U.S.C. §102. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Eamon J. Wall, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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Dated: 12/12/02

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PENDING CLAIMS

1. In a metal capped mirror comprising a stack of dielectric layers of alternating high and low indices of refraction capped with a layer of metal, the improvement comprising a layer consisting of tin oxide to which the metal capping layer is directly adhered.

2. An improved mirror according to Claim 1 wherein said tin oxide layer is disposed at an end of a stack comprising an integral number of pairs of dielectric layers.

3. An improved mirror according to Claim 2 wherein all of said stack layers other than said end layer of tin oxide are of materials other than tin oxide.

4. An improved mirror according to Claim 2 wherein said tin oxide layer is one layer of a pair of dielectric layers disposed at said stack end.

6. In a metal capped mirror comprising a stack of dielectric layers of alternating high and low indices of refraction capped with a layer of metal, the improvement comprising a layer consisting of tin oxide to which the metal capping layer is directly adhered,

said tin oxide layer being disposed at an end of a stack comprising an integral number of pairs of dielectric layers,

said tin oxide layer being one layer of a pair of dielectric layers disposed at said stack end, and

all of said dielectric pairs comprising a layer of tin oxide.

7. An improved mirror according to Claim 1 wherein said layer of metal comprises a continuous uninterrupted end surface of said mirror for preventing light transmission from the mirror in a direction through the stack layers through said mirror end surface.

8. In a metal capped mirror comprising a stack of dielectric layers of alternating high and low indices of refraction capped with a layer of metal, the improvement comprising a layer consisting of tin oxide to which the metal capping layer is directly adhered,

said tin oxide layer being disposed at an end of a stack comprising an integral number of pairs of dielectric layers,

said tin oxide layer being one layer of a first pair of dielectric layers disposed at said stack end, and

all of said dielectric layers other than said one layer of said first pair of dielectric layers being of materials other than tin oxide.

9. An improved mirror according to Claim 1 wherein said metal is of gold.

10. An improved mirror according to Claim 8 wherein said metal is of gold.

11. An improved mirror according to Claim 1 wherein said metal layer provides an exposed and uncovered outer layer of said stack.

12. An improved mirror according to Claim 8 wherein said metal layer provides an exposed and uncovered outer layer of said stack.